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The Elephant (*Elephas maximus* Linn.) in Uttar Pradesh, India

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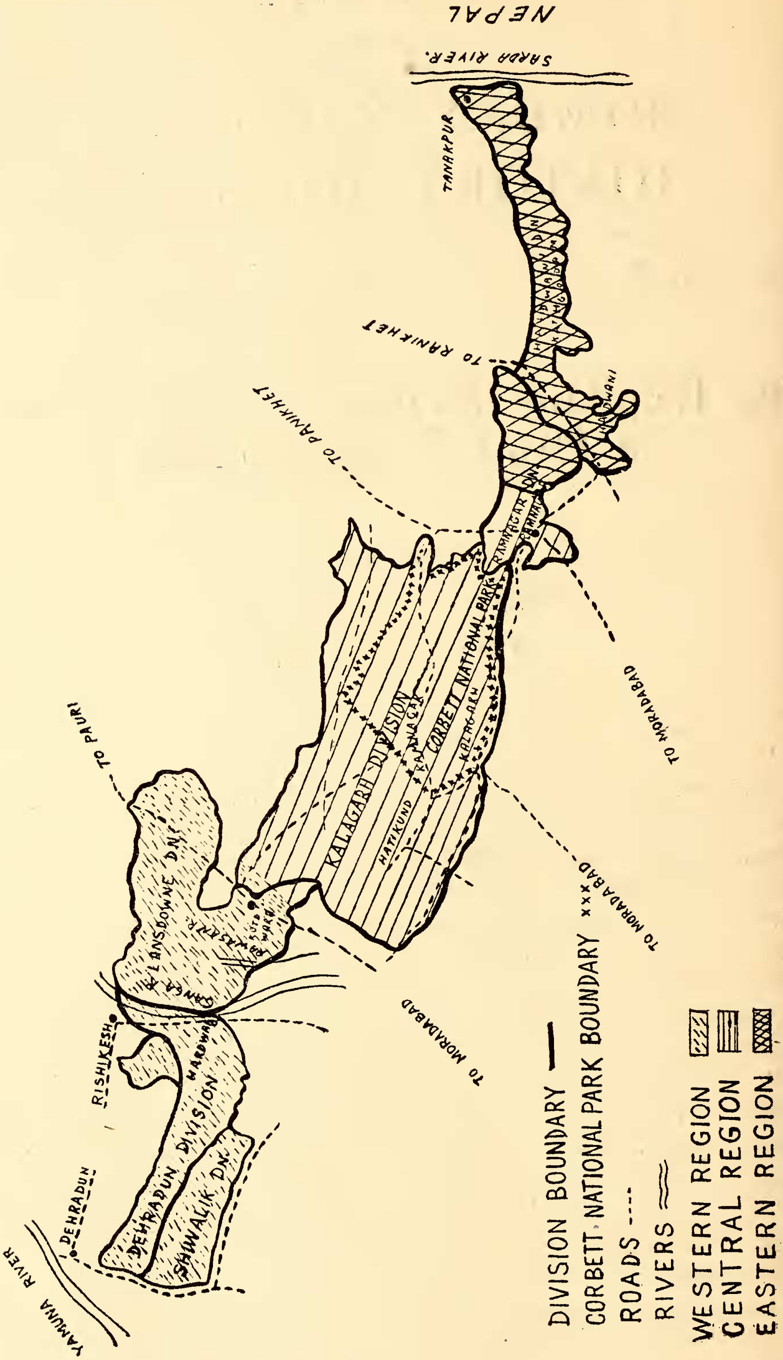
(*With a plate and a map*)

INTRODUCTION

In Uttar Pradesh there has been, for some years, a great deal of agitation against wild elephants which were accused of laying waste agricultural crops and causing human deaths. Newspaper reports describing incidents of damage to crops alleged that the elephant population had grown out of all proportion and called for drastic action in reducing their numbers. It was stated that there were more than 1200 to 1400 elephants in the State and that in Lansdowne Division (Garhwal Dist.) alone there were more than 600 elephants (para 310 of Working Plan of Lansdowne Division 64-65 to 73-74). Some incidents were played up to such an extent that a persistent public demand was created to reduce their numbers. Government had to yield under this powerful pressure, and elephants, protected since 1879 under the Elephant Protection Act 1879, were removed from the protected list in 1963. As many as 27 elephants were killed and 12 were reported to have been wounded. There is no record of the number of unreported wounded. Conservationists alarmed at the eventual threat of extinction of the species strongly represented that the question whether to remove or keep elephants on the protected list should be decided on the basis of a census of the wild population. The argument was accepted by Government and licences to shoot the



Forest Divisions holding elephants in U. P.

animal were withdrawn. This paper reports the census conducted in 1966 and repeated in 1967.

In Uttar Pradesh, elephants are confined to the Tarai and foothills of Dehradun, Siwalik, Lansdowne, Kalagarh, Ramnagar and Haldwani Forest Divisions, in the civil districts of Dehradun, Saharanpur, Garhwal, Bijnor and Nainital. Elephants frequent areas covered with tall forest where the ground is hilly or undulating and where bamboo grows in profusion, or in tall savannah grasslands below the foothills. Their food consists of various kinds of grasses, leaves, stems ; leaves of bamboo, and bark of various species of *Zizyphus*, *Albizzia*, *Grewia*, *Kydia*, *Ficus*, *Terminalia*, *Dalbergia*, *Emblica*, *Mallotus* etc. They also relish all agricultural crops.

Since Independence, forests were clear felled and brought under the plough on a large scale. Construction of projects of public utility, for hydel, irrigation, roads, etc. entailed deforestation of large tracts and colonization brought in its wake cultivation right up to the edge of forest. All this resulted in a significant shrinkage in the habitat of wild animals. While approximately 2,50,000 acres constitute at present the habitat of the wild elephant, it is estimated that roughly an equal area was lost in the process of deforestation during the last two decades. The post-war phenomenon of intensive exploitation of forests and the creation of large scale plantations to meet the ever increasing requirement of raw material further aggravated the situation. Together with a further appreciable reduction in the habitat of wild elephants it brought in its wake decrease in food and water supply. Presence of men and machines in every part of the forest brought men and wild animals in direct conflict much to the detriment of the interests of the latter. The disturbances thus caused to wild animals greatly affected their behaviour. Disturbed from their original homes, elephants sought new homes and have taken refuge in areas which were never frequented by them in the past, as in certain areas of west Dehradun Forest Division. The annual migration of elephants from Nepal into the adjoining forest divisions of Pilibhit and Kheri has come to an end owing to the construction of Sarda Sagar and Sarda Head works. Under these circumstances it was but natural that a clash should occur between the interests of man and elephants. With cultivation just abutting the forest, elephants frequently damaged crops and a loss of 5 to 10 human lives through rogue elephants, especially during the working season when there is an exodus of human population to the forest, became a common feature. Eight to ten such rogue elephants causing loss of human lives were reported to be in existence in the State forests.

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CENSUS

The first census during the year 1966 was of an exploratory nature. It was repeated again during the year 1967 when the experiences of the previous year were used to advantage. The method followed is described below :

1. The census was carried out simultaneously in the forest divisions of Dehradun, Siwalik, Lansdowne, Kalagarh, Bijnor, Ramnagar, Haldwani and Tarai and Bhaber under the supervision of the Wild Life Wardens in the respective regions and under the overall direction of the Chief Wild Life Warden, Uttar Pradesh. These forest divisions comprise the normal habitat of wild elephants in Uttar Pradesh.

2. Each region was further divided into convenient units and a party of wild life and forest Guards was assigned to each unit under the supervision of an officer of the rank of an Assistant Wild Life Warden or Forester. Three copies of a map of each unit were prepared on a suitable scale for marking the location of herds on the map during each count, and for studying the movement of herds on subsequent counts. For the sake of accuracy three to four counts were made and between two counts sufficient gap was provided to allow reasonable movements of the herds.

3. A particular unit allotted to one party for the first count was given to another party for the second count and to a third party for the third count.

4. The whole operation was planned well in advance and before the actual days of count every effort was made to trace and locate the elephants in each unit with the help of available territorial staff and local labour and other persons.

5. On the actual days of count, the party, on locating the elephants, wrote down the number of herd and the total number of elephants in that herd on the map at the place of its location as accurately as possible. Thus 3/8 meant that the third herd encountered by the party had eight elephants in it.

   In addition to this reference in the map, each party also noted separately, as far as could be ascertained, the numbers of male, female and calves in the herd and other characteristics.

6. In order to ensure independent assessment, the enumeration figures of one party were not given or divulged to another party.

During 1966 and 1967 the elephants were censused on the following dates :

1966 census :			1967 census :		
I	Census	15. iii. 66	I	Census	15. iv. 67
II	,,	15. vi. 66	II	,,	30. v. 67
III	,,	30. ix. 66	III	,,	15. vi. 67
IV	,,	15. x. 66			

The results of 1966 and 1967 censuses are given in Tables 1 and 2. The exploratory census of 1966 showed that the rainy season is not

TABLE 1

CENSUS OF ELEPHANTS 1966

Counting date		Western region	CNP[1]	Kotdwara region	Dehradun region	Total
1st Count 15.iii.66						
Adults	..	39	30	186	24	279
Calves	..	9	11	33	—	53
Total	..	48	41	219	24	332
2nd Count 15.vi.66						
Adults	..	66	12	214	4	296
Calves	..	20	3	30	—	53
Total	..	86	15	244	4	349
3rd Count 30.ix.66						
Adults	..	58	No herd located as they had gone outside across Dudhia	215	6	279
Calves	..	15		32	—	47
Total	..	73		247	6	326
4th Count 15.x.66						
Adults	..	78	Counting could not be done due to grass	219	3	300
Calves	..	16		40	—	56
Total	..	94		259	3	356

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[1] Corbett National Park

suitable for census of wild life owing to restricted visibility and presence of tall grass. There was no difficulty in counting of calves but identification of males, and females was difficult so that the sex ratio fluctuated considerably in the first two counts, and one had to be very careful in drawing conclusions from such data. Different investigators used different criteria for sexing wild elephants from a distance, leading to high discrepancy in the sex ratio.

TABLE 2

CENSUS OF ELEPHANTS 1967

Counting date	Western region	CNP	Kotdwara region	Dehradun region	Total
1st Count 15.iv.67					
Male ..	6	9	51	9	75
Female ..	7	16	123	19	165
Calves ..	4	16	42	7	69
Total ..	17	41	216	35	309
2nd Count 30.v.67					
Male ..	22	9	51	30	112
Female ..	40	18	77	36	171
Calves ..	17	11	37	11	76
Total ..	79	38	165	77	359
3rd Count 15.vi.67					
Male ..	16	5	66	14	101
Female ..	27	13	83	27	150
Calves ..	11	9	47	7	74
Total ..	54	27	196	48	325

The experience gained in 1966 was used to full advantage by the field staff to avoid mistakes in field counts and for achieving homogeneity in sexing the elephants.

The result of 1967 census are summarised in Table 3.

TABLE 3

Category	I count 15. iv. 67	II count 30. v. 67	III count 15. vi. 67	Total	Average	Percentage
Male ..	75	112	101	288	96	29
Female ..	165	171	150	486	162	49
Calves ..	69	76	74	219	73	22
Total ..	309	359	325	993	331	100

From the above data we may formulate the hypothesis whether all the three counts represent the same population of elephants. The answer to the above hypothesis is in the affirmative as X2 test yields a value of 5·77 on 4 d.f. whereas its tabulated value is 9·488 at 95% confidence limit. We may infer that in round numbers the population of elephants is likely to be composed of 30% males, 50% females and 20% calves.

Having arrived at the likely composition of the elephant population we may attempt to formulate confidence intervals for average elephant population as follows :—

Category	*Pi*	*npi*	*qi*	*npi qi*	$\sqrt{npi\ qi}$	$\sqrt{npi\ qi}$	95% confidence interval
Male	0·3	96	0·7	67	8	16	80 to 112
Female	0·5	162	0·5	81	9	18	144 to 180
Calves	0·2	73	0·8	58	7·5	15	58 to 88

On the basis of evidence furnished by the data the population of elephants in U.P. is not likely to be more than 400 in number.

DISTRIBUTION AND MOVEMENT

From the analysis of census figures certain interesting features of elephant migration were obtained.

Distribution of herds and their regrouping and migrations indicate three distinct population units in the State. The elephant habitat can accordingly be divided into the following three regions :

(1) Western Region, comprising foothill forests of Siwalik, East and West Dehradun Divisions, Lansdowne, and Bijnor Forest Divisions lying on either side of the Ganga River,

(2) Central Region, extending over Kalagarh and Ramnagar Forest Divisions. It includes the Corbett Park area also.

(3) Eastern Region, covering Haldwani and Tarai and Bhaber Divisions.

There is mingling, interchange and subdivision at the fringes where the territories overlap but by and large the core of each population group maintains its separate identity. There is greater interchange between central and eastern zones.

The elephant is a big wanderer and seldom remains confined to a small area. The food habits of elephants are subject to great seasonal variations, depending upon the natural availability of grasses, leaves and barks of various trees they keep moving to favourable areas. Herds migrate regularly between the eastern and western parts of the Western Region fording the Ganga quite regularly. They usually move from the Lansdowne-Bijnor side to the Dehradun forests sometimes in March-April and return to their former haunts prior to the onset of the monsoon in June. However, the exodus is only partial as quite a few herds inhabit these areas more or less permanently. From the census of 1967 the following conclusions are drawn.

Western Region

The Western Region is the main habitat in the State where the bulk of the elephant population stays. An extensive and wide tract along the left bank of the Ganga in Lansdowne Division is the centre from where herds migrate and spread out in the region depending upon availability of food and water. The largest herd located in Rawason River bed in Lansdowne Division consisted of 111 heads. This big herd divided and regrouped itself and various sub-groups dispersed within a radius of 20 miles at various periods of the year. Smaller herds consisting of 10 to 15 heads did not subdivide and regroup themselves. These smaller herds remained as discrete units and were found to confine themselves to areas 5 to 6 miles in radius.

From the census carried out on 15.iv.67 it was learnt that the main habitat of the herds was Koelpura and Jamankhata blocks of East Dehradun Division, in the north-western part of Lansdowne Division and south-eastern part of Bijnor division, with small stray groups or lone elephants scattered here and there. As migration progressed in winter the number of elephants nearly doubled in areas on the right bank of Ganga in Siwalik-Dehradun Divisions through migrants from the Lansdowne-Bijnor area. Some big herds were noticed during May 1967 in the Jhabrawala-Bahera blocks of Dehradun while the herd foraging in Koelpura-Jamankhata appeared to have split into smaller herds dispersed over Suswa-Koelpura and Motichur blocks of East Dehradun Division. Also, the herds in north-west Lansdowne were noted to have

Above : A tusker and two cows ; and, *Below :* part of a herd in the Corbett National Park.

(*Photos : Author*)

moved south-east and the others from south-east to north-west, to form into larger herds. Only a few animals in splinter groups were seen in forests along the western part of Lansdowne Division lying along the Ganga which might have formed portions of bigger herds on the move across the Ganga. During the month of June, possibly on account of availability of food and water in specially favourable localities the concentration of herds was more pronounced. A big herd was spotted in the westernmost extremity (Mohammadpur block) of the west Dehradun Division which seemed to be a result of movement of herds from Jhabrawala (East Dehradun) and Chillawala (Siwalik Division). The large herd seen in Rawason block of Lansdowne Division appeared to have migrated westward on its way to areas lying nearer to the Ganga. Some small herds were also seen on the left bank of the Ganga nearer to the perennial water source. From the census figures for this region, it is apparent that the number of animals in Dehradun-Siwalik Region which stood at a meagre total of 35 in April 1967 increased to 97 in May 1967 while the number in Lansdowne-Bijnor dwindled from 155 in April 1967 to 131 in May 1967, showing thereby large scale exodus of the animals across the Ganga to the western part of the range. The number in the western part again became halved as the summer advanced as quite a few herds moved back across the Ganga to Lansdowne side. Such seasonal migration of elephants in this region lying on either side of the Ganga is a regular feature.

Central Region

In the Central Region comprising Kalagarh and Ramnagar Forest Divisions, more animals occur in Kalagarh. In this Division the total number of animals varies in different months at different places, indicating that there is regular movement of animals in search of food, water and suitable environment. It was, however, noted that there is always a sizeable herd of elephants near Paterpani within the Corbett Park. The herds keep on roaming between Paterpani and Dhikala, moving nearer to Ramganga during the hottest month. There does not appear to be any significant exodus of the species from Kalagarh to Ramnagar Division as the requirement of the animal for its food and water is always locally available. The number of elephants in Ramnagar Division is quite limited and only a few herds were seen moving within the same or adjoining forest blocks, depending upon the availability of food and water. There is some mingling of this herd with the eastern one along a southern route near Lalkua.

Eastern Region

Although the Tarai forests of Tarai and Bhaber Divisions adjoin Haldwani Forest Division and some elephant herds are encountered there from time to time, the latter is in fact the permanent abode of the species. The elephants move out from Haldwani to Tarai and Bhaber forests only in particular seasons and do not stay there permanently, except when they are attracted by cultivated crops in the bordering areas lying along the outer fringes of the forests. The census carried out during April 1967 showed that there were only two small herds, one in the Horai block in the western part and the other in Dogari block in the eastern part of the Haldwani Division. The number of elephants counted during May 1967 showed a steep rise in population which suddenly stepped up from 11 to 67. In the month of June 1967 the total number of animals came down to 48. From the census figures and the location of various noted herds, it could be inferred that a herd seen in Malani block during May 1967 moved westward to Gaula block while another seen in Dogari during April 1967 also moved westward to Hanspur during June, 1967. Similarly two herds seen in Guliapani and Sonabani forests during May 1967 moved out short distances to adjoining blocks. The Haldwani forests are separated from the adjoining Nepal forests by the Sarda River and elephants cross over from one side to the other. This may perhaps explain the reason for the steep rise in their number in Haldwani Division in late summer. It is apparent that large scale exodus of elephants takes place during this part of the year from the adjoining Nepal forests to Haldwani, while the number again goes down during June when the elephants prefer to move back to more favourable areas in Nepal. It is from these herds that some animals move out to adjoining Tarai and Bhaber forests and return to their permanent habitat in Haldwani Division or Nepal.

CONCLUSIONS

During years of unusual drought the migration tends to be earlier than normal. Similarly forest fires over large tracts of their normal habitat tends to drive them away to new places.

The composition of herds and the number of elephants in each herd fluctuates widely. While herds comprising of as many as 111 elephants have been seen in Lansdowne Division, smaller herds consisting of 2 to 4 elephants are not uncommon, quite apart from solitary animals which may or may not be ‘ rogues ’. Normally, however, the average herd consists of 10 to 20 animals.

The bigger herds have only been located in particularly congenial localities with abundance of food and water, for example, in parts of Lansdowne Division. During winter and rains there appears to be a tendency to move in bigger groups than during summer and other parts of the year when the food supply dwindles and water becomes scarce.

The number of males in a herd shows wide fluctuation. While in the bigger herds males may be present to the extent of 50 per cent, many